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Assessment of nominal operating cell temperature of PV module using different methods based on IEC61215

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ABSTRACT

The International Standard IEC 61215 plays a crucial role in ensuring the quality and reliability of photovoltaic (PV) modules, particularly in determining the nominal operating cell temperature (NOCT). This standard defines specific operating conditions to ensure consistency in testing, including the requirement that ambient temperatures should fall within a range of 20 °C ± 15 °C, or not deviate by more than 5 °C during data recording. However, these criteria may not be universally applicable, especially in regions with diverse climates or extreme temperature variations. Recognising this limitation, the study proposes three alternative methods for calculating NOCT that can accommodate broader temperature ranges: first, rejecting data points where ambient temperatures fall below the minimum of Tamb + 5 °C, and similarly, rejecting data points where ambient temperatures exceed the maximum of Tamb – 5 °C; second, excluding data points where the temperature difference between the minimum and maximum recorded values is less than 5 °C. These modifications are introduced to account for regional and climatic differences that could affect the accuracy of NOCT calculations. In this study, these methods will be applied in accordance with IEC 61215 to compute the NOCT of two different PV module technologies: glass-to-glass (PV1) and backsheet-to-glass (PV2). The goal is to assess the performance of each technology by comparing their NOCT values, thus helping to determine which technology exhibits superior thermal efficiency and overall performance. This approach is designed to better reflect real-world conditions and provide more accurate insights into the suitability of PV module technologies for different environmental contexts.

Keywords: NOCT; PV module; IEC 61215; PV performance

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